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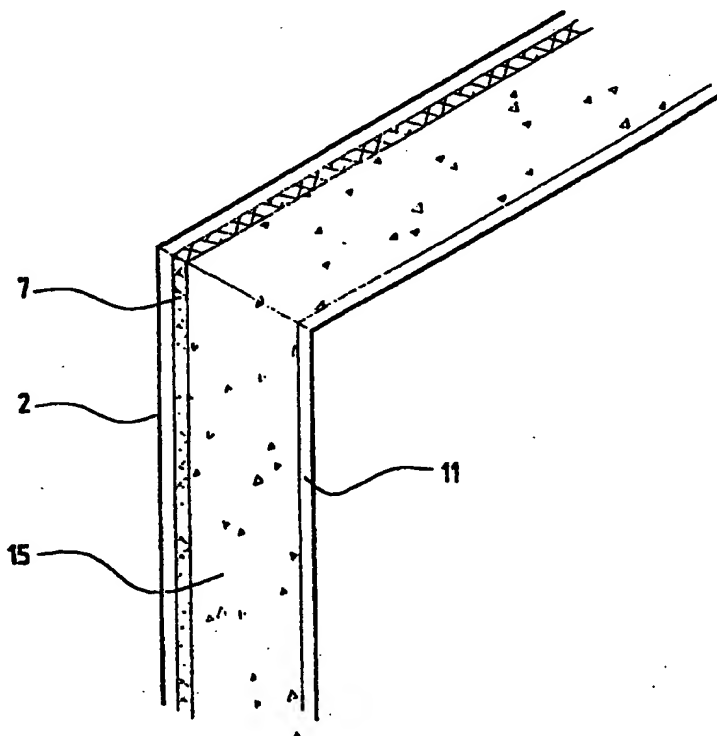
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(21) International Application Number: PCT/NZ98/00105 (22) International Filing Date: 16 July 1998 (16.07.98) (30) Priority Data: 328339 16 July 1997 (16.07.97) NZ (71) Applicant (for all designated States except US): FLETCHER CHALLENGE LIMITED [NZ/NZ]; Fletcher Challenge House, 810 Great South Road, Penrose, Auckland (NZ). (72) Inventor; and (75) Inventor/Applicant (for US only): GERLICH, Johan, Theodoor [NL/NZ]; 56 Gold Road, Paraparaumu, Wellington (NZ). (74) Agents: HAWKINS, Michael, Howard et al.; Baldwin Shelston Waters, NCR Building, 342 Lambton Quay, Wellington (NZ).		(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published With international search report. This paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" under 37 CFR § 1.10 Mailing Label No. <u>Em 39534791305</u>	

(54) Title: REINFORCED PLASTERBOARD

(57) Abstract

A reinforced plasterboard has a first layer of paper (11), a core of a cementitious material (15), a mesh reinforcement (7) and adjacent to that mesh reinforcement (7) a further layer of paper (2). The mesh (7) may be in contact with the paper layer (2).



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REINFORCED PLASTERBOARD

BACKGROUND OF THE INVENTION

The present invention relates to reinforced plasterboard. The term "plasterboard" will, for simplicity, be used throughout the specification to refer to a building material which is formed from any cementitious slurry resulting in a panel of indefinite length which will be then cut to the required sizes. The term "panel" is intended in this specification to cover any type of wall, ceiling or floor component of any required size. Numerous proposals have been put forward in the past, many of them patented, relating to the construction of such plasterboard panels.

Typically, such plasterboard panels have utilised a gypsum or Portland cement slurry. Some of the existing proposals for plasterboard have included the introduction of a reinforcement into the cementitious slurry. This reinforcement has been proposed as comprising glass fibre sheets or fibres, for example.

The proposals for reinforced plasterboard to date have all suffered from various disadvantages, and in particular, a failure to provide a plasterboard which has superior strength to resist typical impacts which can result in a building in which the panel is used. For example, in a panel used as an interior lining in commercial and domestic buildings, it would need to be able to satisfactorily resist the forces of human impact over a substantial period of time.

OBJECTS OF THE INVENTION

It is thus an object of the present invention to provide a reinforced plasterboard and/or a method of producing same which will overcome or at least obviate disadvantages in such plasterboard or its method of production to the present time, or which at least will provide the public with a useful choice.

Further objects of this invention will become apparent from the following description.

SUMMARY OF THE INVENTION

According to one aspect of the present invention, a reinforced plasterboard includes at least a first layer of paper, a core of a cementitious material, at least one layer of a mesh reinforcement and adjacent thereto a further layer of paper.

Preferably the mesh reinforcement is in contact with the further layer of paper.

Preferably, the mesh reinforcement includes an open weave glass fibre mesh.

Preferably, the cementitious material includes gypsum plaster.

According to a further aspect of the present invention, a method of producing a reinforced plasterboard includes providing a continuous feed of a cementitious slurry to spread over a first layer of paper, a continuous feed of a further paper layer, a continuous feed of a reinforcing mesh so as to lie adjacent said further paper layer, means for bringing said layers of paper, said cementitious slurry and said reinforcing mesh together, to result in said cementitious slurry setting between said layers of paper with said reinforcing mesh adjacent said further layer of paper.

Preferably in the above method the reinforcing mesh is in contact with said further layer of paper.

According to a still further aspect of the present invention, there is provided a reinforced plasterboard and/or method of producing same, substantially as herein described with reference to the accompanying drawings.

Further aspects of this invention which should be considered in all its novel aspects will become apparent from the following description, given by way of example of possible embodiments thereof and in which reference is made to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1: shows very diagrammatically a production line for the continuous production of a reinforced plasterboard, according to one possible embodiment of the invention; and

FIGURE 2: shows very diagrammatically a cross sectional view through a reinforced plasterboard according to one possible embodiment of the invention.

BRIEF DESCRIPTION OF PREFERRED EMBODIMENTS

A continuous production line for the manufacturing of a reinforced plasterboard, and according to one possible embodiment of the invention, is referenced generally by arrow 1.

The manufacturing process is seen to involve in this particular embodiment the feeding of a back paper 2 along rollers 3, 4, 5 and 6, and the feeding of a reinforcing mesh 7 from roller 8, so as to lie adjacent the back paper 2, and in this embodiment contacting it.

The term "paper" is used throughout this specification to refer to any suitable outer facing material which is strong and may be a cardboard such as that made from recycled fibres which may include Kraft paper, or the like. The reinforcing mesh may be of any suitable type providing a required density and strength, but a glass fibre or plastics open weave mesh may be particularly suitable such as the commercially available CRENETE (trade mark) mesh.

A cementitious slurry 15 is shown being fed from a feeder 9 which distributes the slurry 15 across the width of a face paper 11, fed via rollers 12, 13 and 14. The slurry 15 may be of any suitable type, but in one preferred embodiment of the invention, may be a gypsum or Portland plaster. Suitable spreading means may be provided so as to ensure that the slurry 15 is distributed evenly across the width of the paper 11. Also guide means may be provided each side of the production line so as to turn up the sides of the paper 11 so as to form a trough in which the slurry 15 can be accommodated. It is envisaged that in one embodiment, the turned up sides of the paper 11 may then be folded over and adhered to the back paper 2.

The process will suitably include heating means to facilitate the setting of the slurry 15 and also cutting means, so that the resultant plasterboard can be cut into appropriate sizes.

It will be appreciated that although single layers of paper 2, 11 and reinforcing mesh 7 are shown being utilised any number of layers can be used as appropriate.

Referring to Figure 2, a reinforced plasterboard according to one possible embodiment of the invention is shown very diagrammatically with a face paper 11, a plaster core 15 such as of gypsum plaster, a reinforcing mesh 7 and immediately adjacent thereto, a back paper layer 2. While in setting, some of the plaster 15 will extrude through the openings in the mesh 7 and bond with the paper 2, the mesh 7 may be positioned so as to be in substantial contact across the entire face of the back paper 2. In this way, the reinforcing mesh 7 is providing a substantial and uniform reinforcement of the plasterboard across the entire face defined by the layer of paper 2 and will thus be able to contribute substantially to the impact resistance of the plasterboard.

In other embodiments the mesh 7 is adjacent the paper 2 but may not be in contact with it.

Where in the foregoing description reference has been made to specific components or integers of the invention having known equivalents then such equivalents are herein incorporated as if individually set forth.

Although this invention has been described by way of example and with reference to possible embodiments thereof it is to be understood that modifications or improvements may be made thereto without departing from the scope of the invention as defined in the appended claims.

CLAIMS:

1. A reinforced plasterboard including at least a first layer of paper, a core of a cementitious material, at least one layer of a mesh reinforcement and adjacent thereto therewith a further layer of paper.
2. A method of producing a reinforced plasterboard including providing a continuous feed of a cementitious slurry to spread over a first layer of paper, a continuous feed of a further paper layer, a continuous feed of a reinforcing mesh so as to lie adjacent said further paper layer, means for bringing said layers of paper, said cementitious slurry and said reinforcing mesh together to result in said cementitious slurry setting between said layers of papers with said reinforcing mesh adjacent said further layer of paper.
3. A reinforced plaster board as claimed in Claim 1 wherein said mesh reinforcement is immediately adjacent to and in contact with said further layer of paper.
4. A reinforced plasterboard as claimed in Claim 1 or Claim 3 wherein said mesh reinforcement includes an open weave glass fibre mesh.
5. A reinforced plasterboard as claimed in any one of Claims 1, 3 and 4, wherein said cementitious material includes gypsum plaster.
6. A reinforced plasterboard as claimed in any one of Claims 1, and 3 to 5 wherein said paper comprises a cardboard.
7. A reinforced plasterboard as claimed in any one of Claims 1 and 3, 5 and 6 wherein said mesh reinforcement includes a plastics open weave mesh.

8. A method of producing reinforced plasterboard as claimed in Claim 2 wherein said mesh reinforcement is immediately adjacent to and in contact with said further layer of paper.
9. A method of producing a reinforced plasterboard as claimed in Claim 2 or Claim 8 wherein the sides of the first layer of paper are turned up so as to form a trough in which the cementitious slurry can be accommodated.
10. A method of producing a reinforced plasterboard as Claimed in Claim 9 wherein the said sides of the first layer of paper are folded over and adhered to the further paper layer.
11. A method of producing a reinforced plasterboard as claimed in any one of Claims 2 and 8 to 10 and including heating means to facilitate the setting of the cementitious material.
12. A reinforced plasterboard substantially as herein described with reference to Figure 2 of the accompanying drawings.
13. A method of producing a reinforced plasterboard substantially as herein described with reference to Figure 1 of the accompanying drawings.
14. A reinforced plasterboard produced by the method of any one of claims 2, 8 to 11 and 13.

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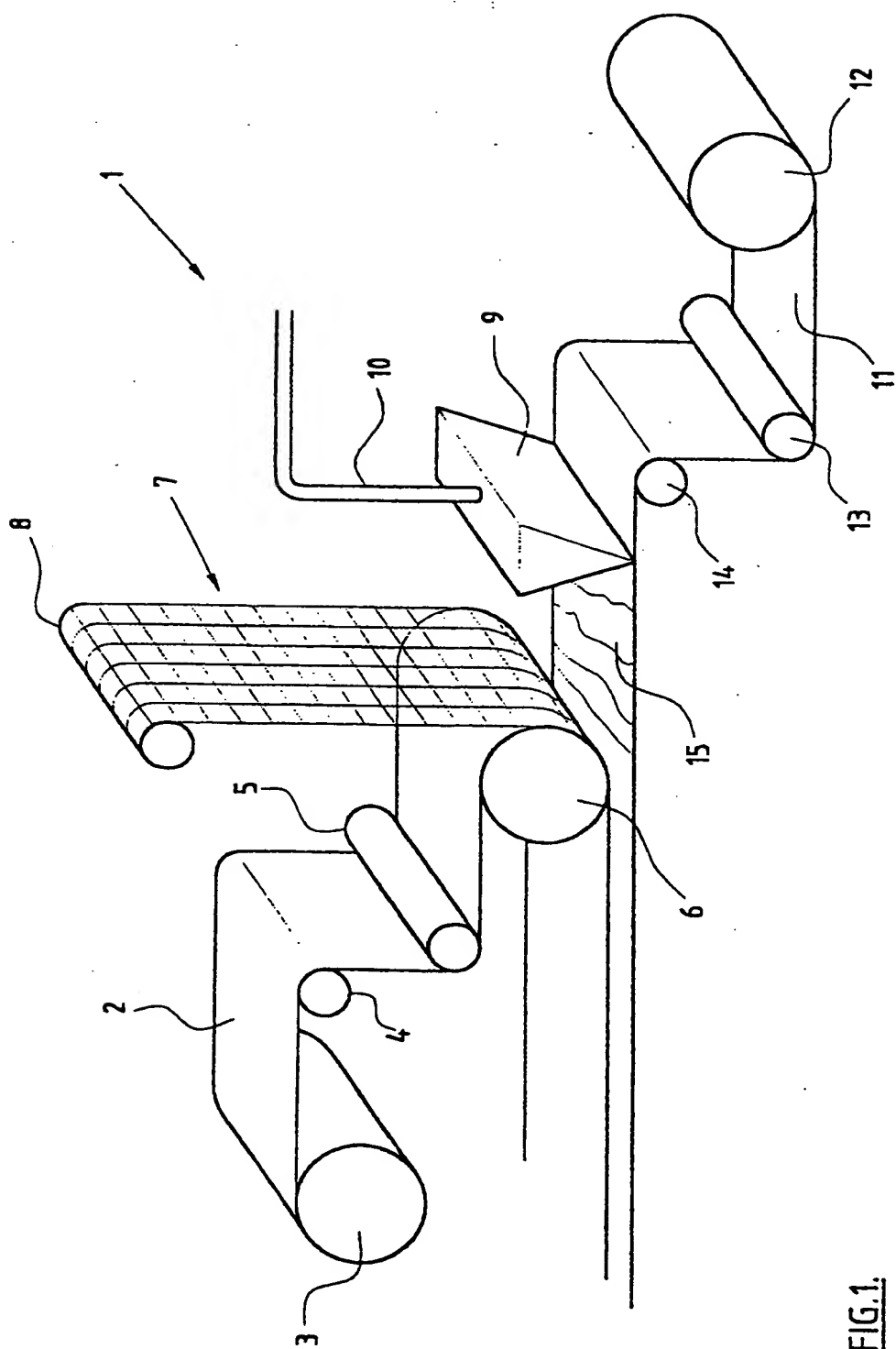


FIG. 1.

2/2

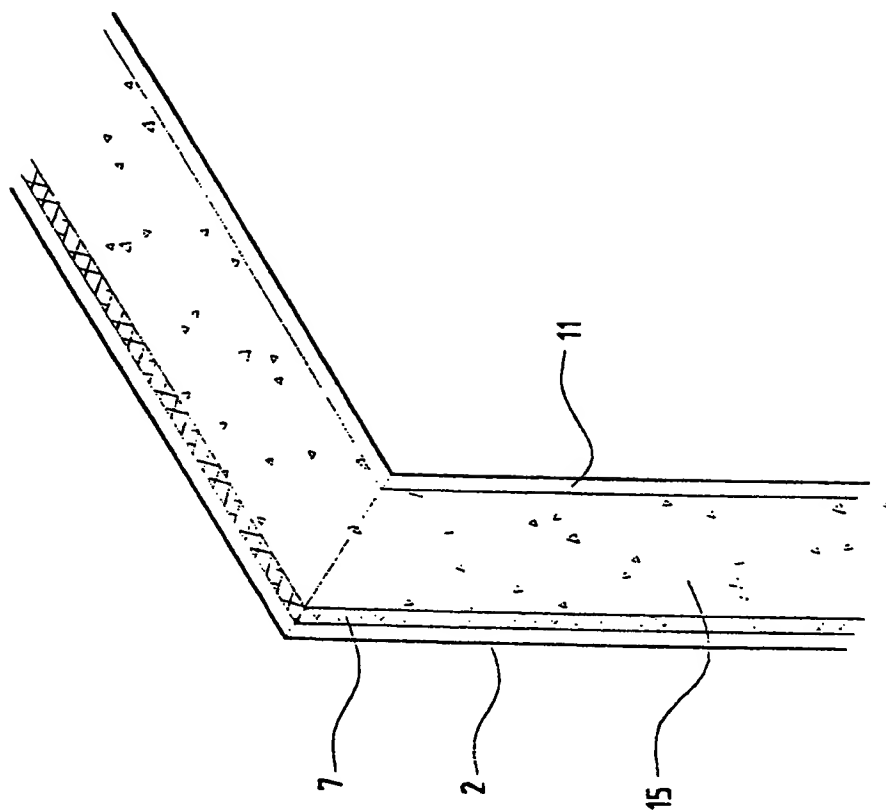



FIG. 2.

INTERNATIONAL SEARCH REPORT

International Application N.
PCT/NZ 98/00105

A. CLASSIFICATION OF SUBJECT MATTER		
Int Cl ⁶ : E04C 2/06, B28B 1/16, 5/02, 23/18		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) IPC (6): E04C 2/06, B28B 1/16, 5/02, 23/18		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU: IPC as above		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US, 4504533, A, (ALTENHÖFER) 12 March 1985 (See columns 3 and 4)	1-11
X	US, 5220762, A, (LEHNERT) 22 June 1993 (See column 14, lines 6-13)	1-8
(X)	US, 3993822, A, (KNAUF) 23 November 1976 (See columns 3 and 4)	1-8
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 4 September 1998		Date of mailing of the international search report 10 SEP 1998
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No.: (02) 6285 3929		Authorized officer DAVID LEE  Telephone No.: (02) 6283 2107

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/NZ 98/00105

C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
(X)	FR, 2323504, A, (KNUT DEDERICH) 13 May 1977 (See figures and English language abstract)	1-8
Y	DE, 2854228, A, (YTONG AG) 19 June 1980	1, 2
Y	DE, 3406449, A, (RIGIPS GMBH) 22 August 1985	1, 2
Y	JP, 55-146736, A, (MITSUO K) 15 November 1980 (Derwent English language abstract, Accession No. 04409 D0/4)	1, 2
Y	JP, 53-146724, A, (ASAHI DOW KK) 20 December 1978 (Derwent English language abstract, Accession No. 09201 B/05)	1, 2
Y	JP, 04-69301, A, (OHBAYASHI CORP.) 4 March 1992 (Patent Abstracts of Japan, C-953, page 107)	1, 2
A	US, 4020237, A, (von Hazmburg) 26 April 1977	

INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application N .
PCT/NZ 98/00105

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
US	4504533	BE	888103	DE	3012293	DK	1184/81
		NL	8101413	NO	811044		
US	5220762	CA	1250727	CA	1293606	CA	1309831
		EP	154094	JP	60226933	JP	8232442
		US	4647496	US	5148645	US	5319900
		US	5644880	US	5704179	US	5791109
		US	4810569	US	5371989	CA	2047123
		DE	4124892	US	5135805	CA	1309828
		CA	1326625	EP	216497	JP	62090460
DE	2854228	AT	993/79	CH	638856	DE	2854228
US	4020237	DE	1696269	FR	1562088	GB	1221821
		US	3562097				
END OF ANNEX							